

# **User Manual for the Einstein 100W Guitar Amplifier**

## **Diezel USA**

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## Chapter One: Safety and Warranty

### 1.1 Safety warnings

We would like to stress the importance of the following points, for reasons of your personal safety, product longevity and product liability.

- Do not use the Amplifier in or near wet locations
- Do not store the Amplifier in damp or wet locations
- Do not operate the Amplifier on voltages other than those designated on the rear panel of the amplifier.
- Do not open the panels of the amplifier. No user serviceable parts inside. Your Einstein operates on very high internal voltages, which may still be present after the Amplifier has been turned off and disconnected for a while.
- Do not use the Amplifier for anything other than its designed purpose: To Amplify Electric Guitar Signals
- Do not use fuses other than those intended and specified for the Amplifier
- Do not use 2-conductor extension cords or anything other than 3-pole grounded outlets for this appliance. Your life may depend on it!

Please observe the following points when transporting your Einstein:

Einstein is a tube-powered amplifier; therefore it is sensitive to shock especially after playing the amplifier for a while. Please store and transport your amplifier gently and try to avoid extreme temperatures, which might produce condensation, resulting in moisture on internal components. Usually a 60 Minute acclimatization period is sufficient to ensure safe operation.

The amplifier should be stored in a controlled environment, and it should be transported in a suitable flight case. Make sure the amplifier gets transported in its normal operating position, not upside down or on its side.

The Einstein's design incorporates a very potent power amplifier. It is configured to deliver satisfying guitar tones at most volume levels. In its normal operational volume level (75-80dB) it will provide beautiful tones with very little coloration. For reasons of your own safety, please do not run the amplifier above these levels for extended periods of time without wearing a hearing protection. Hearing Loss is a long-term ailment, and is not normally curable.

### 1.2 Warranty

Diezel G.m.b.H. of Munich, Germany offers a 1-year transferable warranty on the Einstein 100W Guitar Amplifier. The product must be registered and a dated sales receipt must accompany the registration.

Excluded from this warranty are all vacuum tubes and any abuse done to the amplifier. Also excluded from this warranty are damages resulting from failing to follow the Safety Warnings mentioned in the section 1.1.

Diezel USA is the local executor of this warranty. Customer is responsible for shipping charges to Diezel USA in Orange, California, unless other arrangements were made in advance.

## **Chapter Two: Using Your Einstein**

### **2.1 Mains Connections, Power and Standby**

#### **2.1.1 Mains/Connection to Power Outlet**

Please make sure that both switches (Power and Standby) are in the off position before connecting to the mains circuit. Verify line voltage before connecting the power cord. Never start Einstein without connecting speakers to the proper terminals. (See 3.2.5)

#### **2.1.2 Power up, Warm up, Standby off**

First, turn the Power switch to on (facing up). The indicator light will turn on. This starts the tube heating process. After about 40 seconds, the tubes should be sufficiently heated for normal operation. Your Einstein is then ready for operation and the standby switch can be turned to “run” (also facing up). Premature activation of the standby switch will lead to unnecessary tube stress and subsequent reduction of the power tube’s life span.

#### **2.1.3 Power Tube Caution**

Tubes are electronic components that function only with vacuum intact and under very high operating temperatures. Each tube has one or more heating filaments, much like a light bulb. These filaments heat up the anode of the tube. If you switch the standby switch to the “run” position before these anodes have reached their operating temperature (when the anode surfaces are not heated evenly), this causes undue stress to the tubes and their related components inside the amp. Always give the amp its much needed warm-up time, even if musical inspiration hits you with a full force.

#### **2.1.4 Operating Temperature**

It will take a little more time after warm-up until everything inside the amp is working in sync and to its fullest potential. A trained ear will notice a slightly warmer tone and better complexity in tone after playing the amp for a short while. It’s like stretching before exercising.

### 2.1.5 Power Tube Life

The power tubes of your amplifier are subjected to a certain aging process. Once signs of aging, such as unreliability or unusual noise, are detected, we suggest that you replace all power tubes at once. Matched tube sets age relatively evenly, so our experience suggests. This means that if one goes, the others are not far from meeting the same fate.

The aging process manifests itself by a depletion of a thin layer of wolfram on the anodes. This can take anywhere from 6 months to 3 years, depending on the amount of use of the amplifier.

## Chapter Three: Peripheral Connections

### 3.1 Front Panel Connections

#### 3.1.1 The input jack (“IN”) receives your Electric Guitar signal by means of a shielded guitar cord with 1/4” mono style plug.

Your guitar cord is an important part of your signal chain and its quality and construction type clearly affect the overall tone of your rig. Try and buy the best quality guitar cord that you can or want to afford. Call us if you have doubts and need recommendations. This is where the smart “weak link” comment comes in.

#### 3.1.2 Cable ABC

Some cords and cables sound very neutral; others color the sound spectrum and/or attenuate high frequencies due to capacitance inside the wire and the shield. What are we talking about? OK. A capacitor is used in electronic crossovers, amongst other things, to divide low and high frequencies. Capacitance in a cable cuts your guitar’s high end to a certain degree. Generally, the longer of a cord you use, the more of the cord’s inherent characteristics will be audible.

#### 3.1.3 Cable Selection

In certain circumstances, it is desirable to match a guitar cord to a specific instrument. One may use the otherwise undesirable qualities of a cord to one’s advantage, if one has the time and patience to experiment with different cords and guitars. This should be done while playing with your band, or while recording. Sometimes it is difficult to tell a component’s true advantages until it is used in the right context.

A guitar that has very piercing highs could theoretically be tamed down somewhat by using a long guitar cord that offers some high-end attenuation.

The loops of your Einstein send signals at higher levels and impedances, which makes this section of wiring less sensitive. You should still use reliable and good quality wiring for all loops.

## 3.2 Rear Panel Connections

### 3.2.1 Send/Return Loop

The system consists of 2 separate Loops. It allows creation of effects path in either serial or parallel configurations. The individual channel volume controls determine the signal strength at the send jacks. The range is ... to +10dB. The output impedance is 4.7 k $\Omega$ . To use the Send/Return Loops, connect the “Send” to the “return” or “input” or “in” of the effects unit. Be sure to adjust the input level of the effects unit to the amplifiers level. Most effects units have led bar or other level control devices. The Output of the effects unit must be connected to one of the return jacks, parallel,, or serial. If you use the parallel return, then the signal can be mixed to the original signal via the rear panel mounted “Volume” control.

### 3.2.2 Parallel or Serial

Which is better for you? Read on.

There are 2 ways to handle effects signals. The serial loop interrupts the signal path of the Einstein and the signal is sent to the processor, becomes processed, then sent back to the serial return into the power amp. Digital effects units often digitize this signal once received, then process the signal, convert it back to analog, then send it to the amp. This is called ADA (analog digital analog) conversion. It is necessary for digital effects units digitize your guitar signal so that the processor can read and understand signal. Your tubes, however, need an analog signal to operate, so the processor converts the signal back to analog before it goes back to the amp. Generally, even in highest quality effects processors, this causes a change in the original signal, typically a loss of tonality and warmth, also noticeable as a “harder” sound. When you use the serial loop for an effects unit like this, then your signal will have been ADA converted at least once. Tone junkies and vintage freaks alike will more than likely have hives developing by now. But - as always, there is a better way. Use the Parallel loop and the Volume control in the rear determines how much effect signal is being added to the original signal, which now still flows through the amplifier. There is always an analog connection between the send and return jacks; a parallel loop!

**Important:** You must set the mix control on the effects unit to 100% wet when using the parallel loop. Otherwise there will be nasty phasing problems resulting in unsatisfactory tone. The signal portion that is unaffected by the mix control in the effects unit would reach the amplifier at a different time due to the cabling, and cause phasing cancellations.

### 3.2.3 Top 5 Reasons for dynamic losses in the effects loop

Many different factors can be responsible for loss of dynamics, aside from those mentioned in 3.2.2 (ADA conversion). A vital point that often leads to frustration is a maladjusted output level of an effects unit. If the output level is too high, then it will cause unwanted distortion in the power amp. If it is too low, then the rig

will not sound punchy and might get lost in the band sound. When used in the serial loop, the output of the effects unit determines the ultimate drive signal strength of the power amp. The output level should be matched to give the best possible sound with all channels without over driving the power amp section. (Unless this is desired for power amp distortion)  
Headroom adjustments of 10% are usually sufficient.

#### 3.2.4 Compensated Out

A frequency corrected signal will leave this jack if you connect it to a mixer or recording device. Use it to quietly compose or send an auxiliary signal to a console etc. For quiet sessions, just turn the master volumes to “0”.  
Recording a loudspeaker through a microphone is the preferred choice of recording engineers. The compensated out was designed as an alternative for those that don’t have a studio at your fingertips.

#### 3.2.5 Speaker Connections

Einstein has 5 speaker jacks. 1 for a 16Ohm load, 2 for 2 16Ohm loads or 1 8 Ohm load, and 2 for 2 8 Ohm loads or 1 4 Ohm load. Confusing? Oh yes!  
Just do what it says on the jacks, and you’ll be fine

## Chapter Four: Two Pre-Amplifiers

### 4.1 Pre-Amplifiers and their Jobs

The Diezel Einstein comes equipped with 2 different and totally independent preamps. This allows the artist to play through nearly all musical-styles without having to make major changes to his/her amplifier. The preamps are voiced to deliver the most wanted guitar tone flavors: Clean, Crunch, Heavy, Lead. This design concept delivers stellar guitar sounds with excellent playability, warm dynamics and razor sharp equalization possibilities. The tone controls work in an unusually wide range, so a little adjustment does quite a lot. As with so many things, less is often more.

We suggest you start exploring the channels with all controls set to 12:00 o’clock, and the master volume just slightly cracked open. (To avoid hearing damage)

#### 4.1.1 Channel One (low to medium gain)

Clean Tone is a very sensitive subject, because there are so many different ideas on how a clean amp should sound like. Clean tonal textures require much higher dynamic range than distorted sounds. From hard and percussive sounds to soft, warm, and blossoming tone. Einstein was designed to offer as many of the clean varieties as possible. Your choice of guitars and pickups will have a large part in this equation.



Channel one has three modes, selectable by a toggle switch near the channel one gain knob. The modes pre-select different gain stages in the pre-amp, allowing this channel to span the range from extreme clean to a heavy crunch. A player that does not require a clean channel can use these modes for alternate distortion sounds.

#### 4.1.2 Channel Two (high gain)

This channel is voiced for single notes, or for very heavy and massive rhythm guitar. Due to its slight midrange accent and very high gain, it possesses a good punch, will play with ease, and gain authority to rule any stage, or studio. The “less is often more” rule applies here also.

### 4.2 Pre-amplifier Tubes

The pre-amps are equipped with 12AX7 tubes in all positions. The pre-amp tubes are not designed to produce high power output. Therefore, their life expectancy is much higher than that of the power amplifier tubes.

This is not to undermine their utter importance in overall sound and response of the amplifier. Also, annoying defects like crackling noises and low dynamics are directly related to defective pre-amp tubes. Like all other tubes, 12AX7 tubes come in many different gain stages, and offer a wide variety of tonal behavior. Our choice for production was made to ensure a wide variety of tones, with low noise and good reliability.

#### 4.2.1 Microphonics and Bad Noises

The overall performance of pre-amp tubes is easily influenced by external mechanical factors. Malfunction in these external components will manifest themselves by a sudden, high-pitched feedback sound. The input stage is especially suspect to these phenomena. If one encounters microphonic tube behavior, then the first tube should be checked as a rule. Pre-Amplifier tubes can also cause a hum or other bad noises, like crackling or ticking.

## **Chapter Five: Power Amplifier**

### 5.1 Tone and Volume of the Power Amplifier

#### 5.1.1 Master Volume

As the name suggests, this controls the overall, volume of the amplifier. There is also a second, selectable master volume control, which allows volume adjustments via remote control device while playing.

#### 5.1.2 Presence

The presence knob controls frequencies over 3kHz. Treble is produced and dispersed in a very small beam from the speaker, so be sure to position yourself in the projection area of the speaker when making adjustments.

### 5.1.3 Deep

The Deep Control is an active bass control contrary to conventional bass controls. It controls the frequencies around 120Hz without influencing the overall dynamic range of the power amplifier. Diezel Co. is not responsible for disintegrating speaker cabinets.

## 5.2 Power Amplifier Tubes

### 5.2.1 Function

As the name suggests, the power amp section is the part of the amplifier that produces output power, measured in watts. Preamp signals are sent to the power amp(s), which amplifies this signal to a level that is acceptable for loudspeakers. Guitar amplifiers utilize several different types of power amps, which differ in output power and tone. We chose the tube type power amplifier for its tried and true performance and familiar tonal behavior.

### 5.2.2 Selection

Diezel Co. installs the most reliable and best sounding tubes that are currently available in sufficient quantities. So it is possible that tube brand and tube type will change during production. You can fine-tune your Einstein by having different type and brands of tubes installed, however, it is imperative that the amp is biased properly. Einstein utilizes 4 power tubes, organized in 2 pairs with dual bias possibility. This allows use of 2 different pairs of power tubes, either the same or the different types. Yes, this means that in a 4- tube Einstein, you can mix 6550's with EL34's, or 6L6's with KT88's etc. Cool!

A quick and a general overview of the most common tube types for the Einstein:

EL34/6CA7:	aggressive, slender low end, higher total harmonic distortion Recommended bias: 30-35mA
5881/6L6:	great tube for clean sounds, good blues tone, also strong bass and excellent clarity. Recommended bias: 25-35mA
6550:	very loud, very good dynamics, strong low end, amazingly percussive. Recommended bias: 40-60mA
KT88/KT100:	similar to 6550, but very punchy with great clarity and warmth. Expensive. Recommended bias: 35-50mA

### 5.2.3 Life Span

Power tubes last 1 to 3 years, depending on care, volume and frequency of use of the amplifier. If you use your amp only once a month, then the tubes will last much longer. Really. We have heard tubes that are over 10 years old, but it was not a good thing. Tubes age very slowly; slow enough for the artist to get used to the changing tone. To keep things fresh, and to keep your tube dealer in business, we recommend re-tubing, cleaning and biasing once a year if the amp is used frequently.

## Chapter Six: Layout of Controls

### 6.1 Manual Channel Selection

The 2 channels of the Einstein can be selected manually by activating the select switch for either channel. Alternatively, a foot switch can be connected to remotely control the channel selection.

### 6.2 Master 2 On/Off

Master 2 can be used for all channels, and can also be remotely controlled via the included foot switch. This allows instant volume boost, or cut, without fiddling with the amp. Once adjusted to suit your needs for the gig, it's a thing of pure beauty. You can select the Master 2 function via the Diezel 2-button foot switch. Actually, you can also use a readily available single button foot switch with a 1/4" connector.

### 6.3 Channels

- Channel One

Control perimeters include Gain, Volume, Treble, Mid, and Bass. A 3-position toggle switch selects preset gain modes.

- Channel Two

Control perimeters include Gain, Volume, Treble, Mid, and Bass. This channel can be selected via the toggle switch, or via the Diezel 2-button foot switch.

### 6.4 Effects Mix control Rear panel

This control determines the amount of effect signal in the parallel loop

## **Chapter Seven: Maintenance and Cleaning**

### **7.1 Cleaning**

Never use anything wet to clean the amplifier, any amplifier. Usually, it is sufficient to wipe down the outside of the amp with a slightly moist cleaning rag. Do not use abrasive cleaning chemicals. Sometimes a vacuum cleaner can be used to remove dust and dirt from nooks and crevices. Do not remove the chassis from the housing to clean the amp; the inside of your amp carries dangerous Voltages.

### **7.2 Care**

Be gentle with this Amplifier. Any mechanical shocks, extreme temperature changes, damp environments, and other extreme conditions (dust, wind) can substantially shorten tube life. In some cases, even the amplifier life. Do not block the air circulation grilles in the front and in the back of the amp. Do not push the amp right up against objects that would interfere with its normal airflow. The top of the amplifier might get warm after a prolonged use; this is normal, but will melt your ice cream and definitely ruin your beer. Never put beverages on top of the amp where they could spill and flow inside the amplifier. Will you rue the loss of your beverage first or the loss of your amplifier?

### **7.3 Tube Change**

Tube changes are only to be performed by authorized service personnel. If power tubes with different values than the stock tubes are to be installed, then the amplifier must be re-biased before operation can be resumed. The amplifier uses a two circuit bias system. It is quick and easy to accomplish biasing but we recommend that you refer to trained professionals to attempt this procedure.

Salwender International and the Diezel Company wish to express their gratitude and congratulate you on your decision to purchase the Diezel Einstein Amplifier.